Andy M.

New Jersey Department of Health and Senior Services (DHSS)
Consumer and Environmental Health Services
Indoor Environments Program

Jersey City Learning Community Charter School
1 Canal Street
Jersey City, NJ

Indoor Dust Screening Summary Report

Site Background

The Jersey City Learning Community Charter School (LCCS) is located at 1 Canal Street, Jersey City, Hudson County, New Jersey. The building is currently home to the LCCS and a Boys and Girls Club. Redevelopment at the Liberty Harbor North Redevelopment Tract which includes significant disturbance to the soil has been ongoing on all sides of the building for several years. Excavation, grading, trucking of soil and foundation setting activities have occurred in many areas surrounding the building. To support the redevelopment activities heavy equipment and large trucks routinely traverse the numerous areas of the redevelopment sites. These activities raised concerns with the school administration since there is known soil contamination and significant amounts of dust were routinely generated from the site.

The LCCS administration notified the New Jersey Department of Environmental Protection (DEP) about dust emissions being generated from the sites. Subsequently the DEP required ongoing wetting and spraying to keep dust emissions to a minimum. Brinkerhoff Environmental Services (BES) was contracted to conduct outdoor air monitoring in perimeter areas around the redevelopment site as well as locations near the LCCS building. BES utilized aerosol monitors to measure airborne particulates and area air samples to identify any contaminants being released from the redevelopment sites. Summary statements in a BES report dated September 8, 2005 indicate that since the inception of the monitoring program in July 2004, 137 sets of air samples did not indicate the presence of targeted contaminants and that aerosol monitoring did not indicate a potential threat to health. Regardless, the LCCS administration remained concerned about dust emissions and potential exposures occurring inside the building.

The DHSS visited the school with the DEP on October 31, 2005. At that time the DHSS recommended that dust wipe sampling be conducted as a screening tool to assess and possibly identify known soil contaminants from the redevelopments sites inside the building. Table 1 below provides a list of the contaminants identified in the soil above the DEP residential soil clean-up criteria. Based on historical site information, additional contaminants of concern included asbestos and chromium.

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Table 1 – Contaminants Detected above the NJ Residential Soil Clean-up Criteria in the Redevelopment Sites

Contaminants	Soil	
Chrysene		x
PAH		
• Benzo (a) anthracene	x	x
• Benzo (b) fluoranthene	x	x
• Benzo (k) fluoranthene	x	x
• Benzo (a) Pyrene	x	x
• Indeno (1, 2, 3 – c, d) pyrene	x	x
• Dibenzo (a, h) anthracene	x	x
Antimony	x	
Arsenic	x	x
Copper	x	x
Lead	x	x
Mercury	x	x
Nickel	x	
Zinc	x	x
PCB		x

DHSS Sampling Plan

The DHSS sampling plan was designed to be a screening evaluation and not a comprehensive environmental assessment of the building. The objective of the sampling plan was to collect dust wipe samples in several areas of the building which housed the LCCS only to screen for metals which were previously identified in the soil of the surrounding redevelopment sites. The goal was to assess whether any of the known soil metals could be identified inside the building. Sampling of dust loading was utilized to assess the impact of any accumulation on horizontal surfaces.

To collect wipe samples which could identify all the metals listed in Table 1, six separate wipe samples were collected. The six different screening samples included metals (excluding mercury), polychlorinated biphenyls (PCB), polycyclic aromatic hydrocarbons (PAH), asbestos, mercury and hexavalent chromium. Depending on the sampling locations identified, all metals were not screened for at every location.

Sampling Locations

During a walk-through of the building, sampling locations where dust wipe samples could be collected for screening were identified. The DHSS focused on perimeter areas inside the building which were adjacent to properties undergoing redevelopment on the East, South and West sides of the building. The DHSS targeted eight sampling locations for the screening. The wipe sample locations within each area/room were biased towards areas that may not have been

subjected to routine cleaning and where visible dust was identified. Locations included window areas, underneath or on top of shelving and other fixtures, underneath appliances against walls, HVAC vents, or other horizontal surfaces. A detailed description of the sampling location, including physical dimensions, surface type, building component etc., was documented.

Dust Wipe Sampling Procedures

Wipe samples of surface dust were collected from the floors, window areas, ventilation vents and other horizontal surfaces in selected locations. The targeted surface area wiped was 1 ft^2 for each sample but some areas did not meet this condition. If surface areas to be sampled were less that 1 ft^2, the area sampled was measured so comparisons could be made between locations. Reusable templates (12" by 12") were utilized where appropriate to provide a standardized sampling area.

Standardized dust wipe sampling procedures were followed for all wipe samples. For metals, ASTM D6966-03 "Standard Practice for Collection of Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals" was followed. For PCB and PAH samples, ASTM D6661-01 "Standard Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling, was followed. As described in this method, chemical treatment of the wipe material was required prior to sample collection. A summary of the chemical treatment is outlined in the Analytical Section below. Similar procedures outlined in the DEP Field Sampling Procedures Manual (2005) where appropriate were also referenced for this sampling. For asbestos, ASTM D6480-99 "Standard Test Method for Wipe Sampling of Surfaces, Indirect Preparation, and Analysis for Asbestos Structure Number Concentration by Transmission Electron Microscopy" was followed.

Sample Custody

Field sampling forms were filled out for each sample documenting all relevant information such as building floor, area/room and sample location, etc. In addition, field notes regarding type of wipe used, collection protocol, etc. were also maintained. Sample documentation included an assigned sample number identifying the sample in the scheme described. This information was verified after each phase of the sampling and after all of the samples were collected.

Chain of Custody

Chain of Custody procedures were used to document the identity of the sample and its handling from its first existence as a sample through the completion of analysis and the reporting of data. Chain of Custody records were maintained from the time the sample was collected through all changes of custody until it was transferred to the analytical laboratory. Internal laboratory records will document the custody of the sample through its final disposal.

Samples were submitted to the laboratory using a Request for Analysis form and Chain of Custody form provided by the laboratory. The form accompanied the samples and each person having custody of the samples noted receipt of the sample and completed the appropriate section of the form.

Analytical Methods

The laboratory selected for analysis was accredited by the American Industrial Hygiene Association (AIHA) for analysis of these types of samples. The wipe sampling procedures followed standardized procedures as noted above. The wipe materials and analytical methods identified by the accredited laboratory are identified in Table 2 below.

Table 2 – Wipe Sample Media and Analytical Methods

[illegible]	[illegible]	[illegible]	[illegible]
Metals	Wipe	Moistened	EPA SW846-6010b
PCB	Gauze	Hexane	EPA SW846-8082
PAH	Gauze	Methylene Chloride	EPA SW846-8270c
Mercury	Wipe	Moistened	EPA SW846-7471a
Asbestos	Microfilament	Isopropyl Alcohol & Water	ASTM D6480-99
Hexavalent Chromium	Wipe	Moistened	EPA SW846-7196a

Quality Control

A unique sample identification number similar to the other samples was used for each field blank sample to ensure that the laboratory is "blind" to the field blanks. Blanks were collected by removing a wipe from the container with a new glove, shaking the wipe open, re-folding as it occurs during the actual sampling procedure, and inserting it into the sample container without touching any surface or other object. One field blank was collected for each type of wipe sample collected and accompanied the samples to the laboratory. Blanks were used to identify sample contamination anywhere in the normal process of sample collection, transport, preparation and analysis.

Results

The DHSS conducted dust wipe sampling to screen for known soil contaminants inside the LCCS area of the building on April 7, 2006. The DHSS collected 51 wipe samples (45 dust samples and 6 field blanks) in eight perimeter functional spaces. Functional spaces included five classrooms and one hallway inside the building and two classroom trailers adjacent to the east and west sides of the building.

Dust wipe samples were collected in areas that were not subject to routine cleaning and included floor areas, window surfaces, ceiling vents and on top of ventilation ductwork. Accumulated dust was easily identified on these surfaces and provided adequate material for analysis.

No asbestos fibers, PCB, PAH or hexavalent chromium was detected in any of the wipe samples. Metals identified in Table 1 above were found inside the building in each dust sample location. Table 3 below provides the results of each wipe sample and the metal identified.

Table 3 – Sampling Areas and Results for Each Metal* Screened.

Room/Area Sampled	Metal Sample Location	Metal	Result (mg/wipe)	Floor Sample Location	Result (mg/wipe)
Faith's 5th Grade 3rd Floor (600A)	Top of Window Sash	Sb	5.8	Top of Cabinet	0.13
		As	1.0		
		Cr	17		
		Cu	92		
		Pb	39		
		Ni	20		
		Zn	610		
	Ceiling Return Vent	Sb	220	NS	NS
		As	130		
		Cr	720		
		Cu	2800		
		Pb	2200		
		Ni	1200		
		Zn	14000		
Playground Hallway 3rd Floor (600B)	Top of Window Sash	Sb	2.2	NS	NS
		As	0.69		
		Cr	7.0		
		Cu	39		
		Pb	26		
		Ni	9.5		
		Zn	160		
Leslie's 4th Grade 3rd Floor (600C)	Top of HVAC	Sb	5.7	Top of Duct	0.024
		As	1.3		
		Cr	16		
		Cu	21000		
		Pb	29		
		Ni	16		
		Zn	1200		
Sarah's 4th Grade 2nd Floor (600D)	Ceiling Return Vent	Sb	64	Ceiling Supply Vent	0.089
		As	ND		
		Cr	15		
		Cu	37		
		Pb	24		
		Ni	13		
		Zn	270		
Eva/Ashley's 1st Grade Mezzanine Level	Top of Window Sash	Sb	4.3	Top of Window Sash	0.041
		As	1.8		
		Cr	14		

Table 3 – Sampling Areas and Results for Each Metal* Screened.

(600E)		Cu	410		
		Pb	110		
		Ni	120		
		Zn	320		
MS-2 Classroom 1st Floor (600F)	Top of Window Sash	Sb	3.3	Top of Window Sash	0.093
		As	0.94		
		Cr	7.8		
		Cu	130		
		Pb	27		
		Ni	45		
		Zn	270		
Trailer 4/5 1st Floor (600G)	Top of Window	Sb	5.2	Top of Window	0.18
		As	2.0		
		Cr	9.5		
		Cu	24		
		Pb	20		
		Ni	8.4		
		Zn	130		
Kim's Trailer 1st Floor (600H)	Window Sill	Sb	8.2	Window Sill	0.073
		As	8.2		
		Cr	34		
		Cu	110		
		Pb	270		
		Ni	27		
		Zn	760		

* Sb – Antimony, As – Arsenic, Cr – Chromium, Cu – Copper, Pb – Lead, Ni – Nickel, Zn – Zinc
NS – A sample for that metal was not collected in this location

The return vent in Faith's 5th grade had the highest metal loading of the samples collected except for copper (Cu). The highest loading for copper was found on top of the ductwork in Leslie's 4th grade. Generally, zinc (Zn) was found to be the highest loading followed by copper, lead, nickel and chromium.

A metal profile was developed for both the inside dust and outside soil using the percentage of each metal in the samples collected. This profile was used to compare the distribution of metals found in the inside dust and outside soil. The median percent of each metal in the soil and dust samples were plotted and presented in Figure 1 below. The figure demonstrates a similar distribution pattern for the percentage of metals in the samples for both the soil and dust. Based on the similar distribution and the detection of all the metals identified, it appears that the outside soil is the source of the metals in the dust inside the building.

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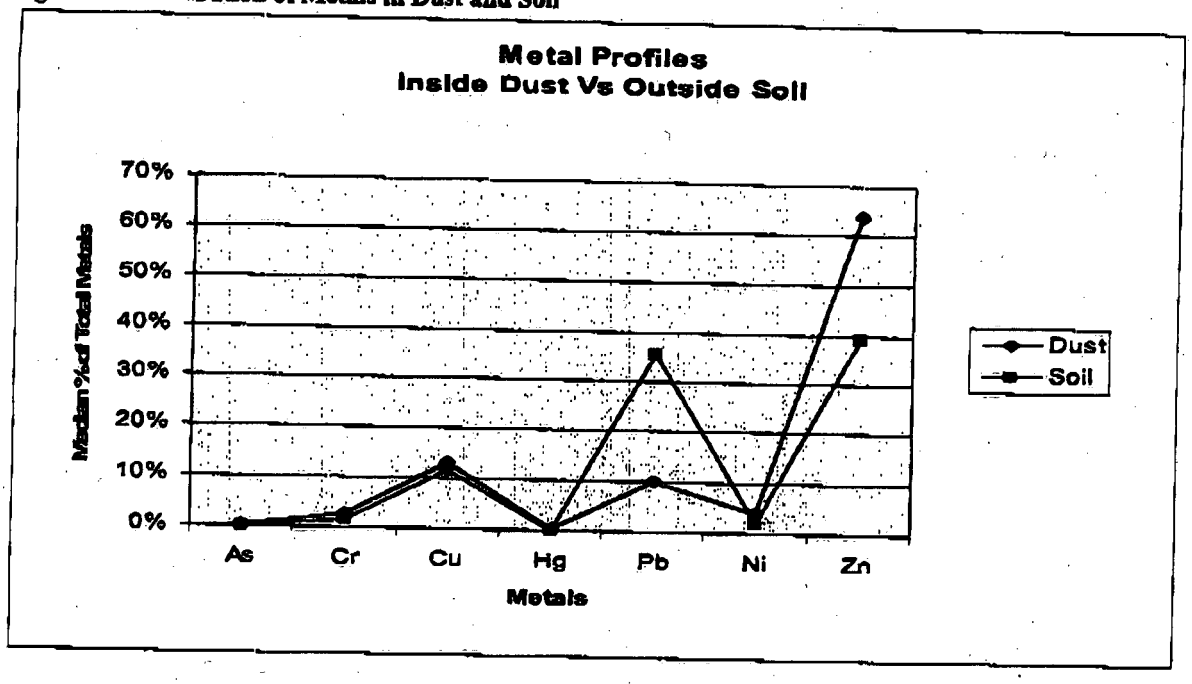
Figure 1 – Distribution of Metals in Dust and Soil



Conclusions

The sample results indicate that metals identified in Table 1 above appear to have accumulated in measurable amounts inside the building in areas that were not subject to routine cleaning. With a few exceptions, the metal loading in the samples appears to be generally low at this time. However, ongoing dust emissions from the soil disturbance in the redevelopment area could continue to impact the building. Since the metals have been identified inside the building the dust migration must be reduced as much as possible or eliminated completely. The results also demonstrate the need for cleaning to remove all dust reservoirs and for procedures to prevent future dust accumulations inside the building.

Based on the results from this assessment and the potential for continued dust emissions from the redevelopment site, the recommendations provided below should be implemented.

Recommendations

- A thorough cleaning of the entire building including the ventilation system should be conducted to remove dust reservoirs. Routine cleaning should be conducted in all areas of the building to avoid dust from re-accumulating.

- Disturbance of contaminated soil in the surrounding redevelopment sites should be kept to a minimum to prevent dust emissions from impacting the building. If the soil is disturbed wetting of the soil as well as roads, trucks or other vehicles leaving the redevelopment site needs to be conducted at all times. Any mound of soils should be covered and stored away from the building.

- Routine visual inspections should be conducted to assess the conditions inside the building.

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MEMORANDUM

June 26, 2006

TO: **David Henderson, Site Manager, Bureau of Site Management**

FROM: **Andrew C. Marinucci, Ph.D., Technical Coordinator**

SUBJECT: **Site 175, the Early learning Center**
Air Sampling Results of April 2006

Background:

The Jersey City Learning Center (JCLC) building is located at Canal Street in Jersey City, Hudson County. The building currently houses a Charter School and a Boys and Girls Club. The site is adjacent to several redevelopment projects (Flintkote and Liberty Harbor). These projects occupy contaminated properties and are a potential source of suspended particulates during construction. This particulate contamination has become a concern to the officials of the JCLC, as such; the Department has undertaken an air sampling program in and around the building.

Sampling Plan:

While past exposures to airborne particulates cannot be assessed, an evaluation of current risk via the inhalation pathway was undertaken. As such, a proposed sampling plan was prepared and forwarded to the Site Manager for implementation (Memo from Andrew C. Marinucci to David Henderson, 3/14/2006) The current USEPA Region III Risk Based Criteria for ambient air were used to evaluate health risk from the results of the air sampling episode. These calculated values are based on a 24 hr exposure. Criteria or regulatory values from other regulatory agencies will be used if contaminants are not contained in the Region III list (Table 1). Analytes were chosen from the list of constituents detected at unacceptable levels from results of bulk analysis of soils from the nearby redevelopment sites (Flintkote and Liberty Harbor). Inside, outside, up and down wind sampling stations were established and sampling took place during 8 hr periods when there was active construction at the nearby sites. In order to minimize classroom disruptions, the testing took place during a week when school was not in session; however, ventilation systems were left running to most closely approximate normal air exchange rates. Air sampling was set up using a series of high volume air filtering equipment and parameters that are designed to evaluate the respirable (PM 10) fraction of the targeted air contaminants. Appropriate filters (47 mm) were used for the analytes in question. Flow rates

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Table 1. Potential particulate air contaminants and applicable action levels.

Potential air-borne particulate Contaminants	Contaminant found in Soil at Redevelopment sites		Region III Air Criteria ($\mu g/m^3$)
	Flintkote	Liberty Harbor	
Chrysene		X	8.6×10^{-1}
Benzo (a) anthracene	x	X	8.6×10^{-3}
Benzo (b) fluoranthene	x	X	8.6×10^{-3}
Benzo (k) fluoranthene	x	X	8.6×10^{-2}
Benzo (a) Pyrene	x	X	2.0×10^{-3}
Indeno (1, 2, 3 – c,d) pyrene	x	X	8.6×10^{-3}
Dibenzo (a, h) anthracene	x	X	8.6×10^{-4}
Antimony	x		1.5×10^{0}
Arsenic	x	X	4.1×10^{-4}
Copper	x	X	1.5×10^{2}
Lead	x	X	1.5×10^{0}
Mercury	x	X	3.1×10^{-1}
Nickel	x		7.3×10^{1}
Zinc	x	X	1.1×10^{3}
PCB		X	3.1×10^{-3}
Chromium III			5.5×10^{5}
Chromium VI			1.5×10^{-4}
Asbestos			To be determined by DHSS or DCA

*EPA Air Standard (1979)

were approximately 2 l/min and the duration of sampling was 8 hrs. This time period covers a typical school exposure and is the prescribed sampling period for the chosen sampling methods. A bank of 6 dedicated air samplers were use at each of the 7 sampling stations to sample for specific analytes (Table 2). Air sampling was conducted by a Certified Industrial Hygienist in the employment of PMK Group of Cranford, NJ. Samples with appropriate blanks were sent to EMSL of Westmont, NJ for analysis.

Data was transmitted to the Department as a simple report from PMK with accompanying laboratory data summaries. The laboratory summaries contained chain of custody forms and simple analytical parameters. As such, the delivered data package could not undergo QA/QC review in any form. The report prepared by PMK was found to have transcription errors that are corrected in this memo.

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Table 2. Air Sampling Methods used in the Jersey City Learning Center air evaluation.

Analytical Group	Method
Polynuclear Aromatic Hydrocarbons (PAHs) i.e. Chrysene, Benzo (a) anthracene, Benzo (b) fluoranthene, Benzo (k) fluoranthene, Benzo (a) Pyrene, Indeno (1, 2, 3 – c,d) pyrene, Dibenzo (a, h) anthracene	NIOSH Method 5506
Metals (Antimony, Arsenic, Chromium, Copper, Lead, Nickel, Zinc)	NIOSH Method 7300
Asbestos by TEM	NIOSH Method 7402
Hexavalent Chromium	OSHA ID-215
Mercury	NIOSH Method 6009
PCBs	NIOSH Method 5503

Results:

The above sampling was carried out by PMK in a subcontract from Louis Berger. The sampling occurred on April 11 and April 12 of 2006. Two distinct set of data were collected on each day. Air was drawn through the appropriate filter for analysis at a rate of approximately 2 l/hr. Air was sampled for a length of 8 hrs starting around 8 AM each day. Sampling locations were:

1. Outside the front entrance of building – Northwest quadrant of complex
2. Outside courtyard in back of JCLC building.
3. Trailer MS #3 located in the Southeast quadrant of complex
4. Trailer (Kimberly's 2nd Grade) Located in Southwest quadrant of complex
5. Ms. Lesley's classroom located on 4th Floor
6. Ashley's 1st Grade classroom on the Mezzanine Level
7. Upwind of the redevelopment area, Northeast quadrant of complex
   (Upwind sample station determined by windsock)

The results from each day were averaged and the summary (Table 3) showed that all constituents, with the exception of total Chromium, were not detected at the minimum detection limit reported by the laboratory. At the minimum detection level, all constituents were below 8 hr exposure occupational health standards (standards not shown). EPA Region 3 calculated criteria were not achieved at the reporting limit for several constituents. These were Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)Pyrene, Indeno(1,2,3 – c,d) pyrene, Dibenzo (a, h) anthracene, Arsenic, Mercury, PCB, and Chromium VI In conversation with the Certified Industrial Hygienist, these detection limits were the most sensitive for the methods that were used in this study. The results show that there was no significant differences were observed between samples taken up-wind and down wind out side the building; likewise the levels of contaminants were the same for samples taken inside and outside the building. Based on the results of this study, there appears to be no impact from the nearby construction on the ambient air of the Learning Center. These results should be forwarded to the Department of Health as they collected bulk dust samples which may help to confirm or refute the above conclusion.

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Table 3. Results of Air monitoring in and around the Jersey City Learning Center.
Value shown are the average of the values collected on April 11 and April 12 of 2006

Potential air-borne particulate Contaminants	Region III Air Criteria (µg/m3)	JCLC Sample Results (µg/m3) Average of two sampling events													
		Outside Front		Outside Courtyard		MS #3 trailer SE corner		Upwind-NE Corner		SW Trailer		4th Floor - Ms. Lesley's Classroom		Mezzanine - Ashley's 1st Grade Classroom	
Chrysene	0.8600	0.225	U	0.23	U	0.23	U	0.22	U	0.23	U	0.23	U	0.23	U
Benzo (a) anthracene	0.0086	0.57	U	0.565	U	0.575	U	0.56	U	0.58	U	0.58	U	0.57	U
Benzo (b) fluoranthene	0.0086	0.57	U	0.565	U	0.575	U	0.56	U	0.58	U	0.58	U	0.57	U
Benzo (k) fluoranthene	0.0860	0.57	U	0.565	U	0.575	U	0.56	U	0.58	U	0.58	U	0.57	U
Benzo (a) Pyrene	0.0020	0.225	U	0.23	U	0.23	U	0.22	U	0.23	U	0.23	U	0.23	U
Indeno (1, 2, 3 – c,d) pyrene	0.0086	0.58	U	0.565	U	0.575	U	0.56	U	0.58	U	0.58	U	0.57	U
Dibenzo (a, h) anthracene	0.00086	0.57	U	0.565	U	0.575	U	0.56	U	0.58	U	0.58	U	0.57	U
Antimony	1.5	1.2	U	1.15	U	1.35	U	1.2	U	0.95	U	1.35	U	1.15	U
Arsenic	0.00041	0.47	U	0.45	U	0.525	U	0.475	U	0.37	U	0.53	U	0.455	U
Copper	150	1.2	U	1.15	U	1.35	U	1.2	U	0.95	U	1.35	U	1.15	U
Lead	1.5	0.58	U	0.565	U	0.66	U	0.59	U	0.465	U	0.665	U	0.575	U
Mercury	0.31	0.685	U	0.7	U	0.695	U	0.705	U	0.645	U	0.68	U	0.7	U
Nickel	73	1.2	U	1.15	U	1.35	U	1.2	U	0.95	U	1.35	U	1.15	U
Zinc	1100	1.2	U	1.15	U	1.35	U	1.2	U	0.95	U	1.35	U	1.15	U
PCB	0.0031	1.6	U	1.1	U	1.25	U	1.15	U	1.05	U	1.45	U	1.65	U
Chromium	5500	0.58	U	0.58	U	0.66	U	0.59	U	0.465	U	0.7	U	0.58	U
Chromium VI	0.00015	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Asbestos	To be determined by DHSS or DCA	0.002	U	0.0025	U	0.002	U	0.003	U	0.0025	U	0.002	U	0.0025	U

= Value exceeds Region 3 Criteria
U = not detected at the indicated level in any sample
U = detected in at least one value used in the average.

State of New Jersey

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COMMENTS:

Here's the DHSS memo's.